

## Prehistoric Life of the Bakony Site, Hungary, Part 2

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One of my favorite issues of 2018 was the prehistoric life of the Bakony site printed by Magyar Post, the postal service of Hungary. Much to my delight, Magyar Post released a second set in the series on March 4, 2020. These 2 issues follow a long history of stamps exhibiting prehistoric life printed by the Hungarian Postal Service. This article will focus on the 2018 issue as a second article for the 2020 stamps has already been published in the June 2020 issue of Biophilately.



Figure 1: Used set of the 2018 Prehistoric Life of Bakony.

rows of three stamps. The upper row consists from left to right of images of *Ajkaceratops kozmai*, *Pneumatoraptor fodori*, and *Bakonydraco galaczi*. In the lower row are *Hungarosaurus tormai*, *Tharkutosuchus makadii*, and *Pannoniasaurus inexpectatus*.

The Bakony region is in northwestern Hungary and is part of the Transdanubian Range, a hilly region to the west of the Hungarian portion of the Carpathian Mountains, north of Lake Balaton. The Bakony region is a part of the Earth's crust that was folded into a syncline and rocks from Permian to Cretaceous age are exposed at the surface. Older rocks (Triassic, Jurassic and Lower Cretaceous) in the area are composed of limestones and dolomites that record marine deposition in the region, characterized by marine invertebrates (rudistid bivalves, gastropods) and foraminifera. Upper Cretaceous rocks in the Bakony region consist of sandstones, siltstones, gravels, marl, bauxites and limestone. The sandstones, siltstones and gravels (Csehbánya Formation) were deposited in the channels and floodplains of a river that flowed across a portion of an island. The bauxites (a residual tropical soil) are locally mined as an Aluminum ore. The limestones (Ugod Limestone) are slightly younger and represent a rise in sea level in the area and a return to marine

The 2018 set was issued September 3, 2018 in two formats (Scott Catalogue – 4493a -4493f). Figure 1 shows the set that was released for domestic and international use. A second special format was printed as well (Figure 2) and were not useable as postage. The second souvenir sheet was printed as a monochrome numbered issue. In addition, a special postmark was produced for the first day ceremony, showing the beak of *Ajkaceratops kozmai*. The official first day cover is reproduced in figure 3. Both souvenir sheets are organized with two



Figure 2: Special Monochrome set of the Prehistoric Life of Bakony.



Figure 3: Official First Day cover for the Prehistoric Life of Bakony 2018 set. In the upper right corner, the commemorative postmark is mostly visible – with the beak structure overlapping a tree and the text partly obscuring the anterior of an individual of *Bakonydraco galaczi*.

bordering the Tethys Ocean. As part of the break-up of Pangea, Africa and the Arabian plate were moving north towards Eurasia – this slow collision would build the Alps, the Carpathians and the Zagros Mountains, while slowly removing the intervening Tethys Ocean. Global climate was warmer than today, with no ice caps at the poles. With no ice caps, sea level was much higher and broad swathes of the continents were submerged underwater. Large portions of Europe were flooded, but the active collision was buckling parts of the southern Eurasian margin to form islands. The warmer climate fostered the precipitation and accumulation of fossiliferous limestones through much of Europe including the thick chalk deposits of the Jurassic and Cretaceous. In fact, the Cretaceous is named for the Latin word *creta* for chalk!

This European Cretaceous Archipelago has had a long history of dinosaur paleontology. Baron Nopcsa described a diminutive fauna of dinosaurs from Romania – diminutive in that many of the species were smaller in size than their relatives in North America and Eurasia. There were also the early discoveries of dinosaurs in England that led to Sir Richard Owen coining the term *dinosauria* as well as amazing discoveries of *Iguanodon*s from Belgium. The Hungarian dinosaur occurrences were first described in 2000.

*Ajkaceratops kosmai* is a small ceratopsian, a quadrupedal, herbivore. Its name is derived from the nearby city of Ajka and after the geologist Károly Kozma. The front portion of *Ajkaceratops*'s jaws were distinctly beak-shaped. Unlike more advanced ceratopsians like *Triceratops*, the bony frill at the back of the skull was much reduced in size. Most of the fossil specimens consist of skull fragments. In terms of affinity, *Ajkaceratops* is thought to be more closely related to ceratopsians from Asia – the bagaceratopsids, *Bagaceratops* and *Magnirostris*. Based on comparison of the skull with the bagaceratopsids, *Ajkaceratops* is reconstructed as a quadruped 1-meter in length.

*Pneumatoraptor fodori* is a small carnivorous theropod dinosaur. The species is named for the characteristic of the bones – the bones were pneumatized, i.e. characterized by air-filled cavities similar

conditions characterized by open marine organisms like rudistid bivalves. The Csehbánya Formation is constrained to the Santonian and Campanian Stages based on analysis of fossil pollen, approximately 85 million years ago during the Late Cretaceous.

If we were to travel back in time to this interval, we would visit a very different world. The supercontinent Pangea had started to break apart in the Late Triassic, and by the Late Cretaceous the shapes and distribution of continents was starting to look somewhat similar to today with a few exceptions – North America and South America were separate, Antarctica and Australia were still fused as a remnant of the older Gondwanaland Supercontinent, and India was an island continent



Figure 4: Commemorative postmark for the first day ceremony. Postmark shows an image of the beak of *Ajkaceratops kosmai*. Use of the image was graciously given by Michael Kogan from his website (<http://www.paleophilatelie.eu/index.html>).



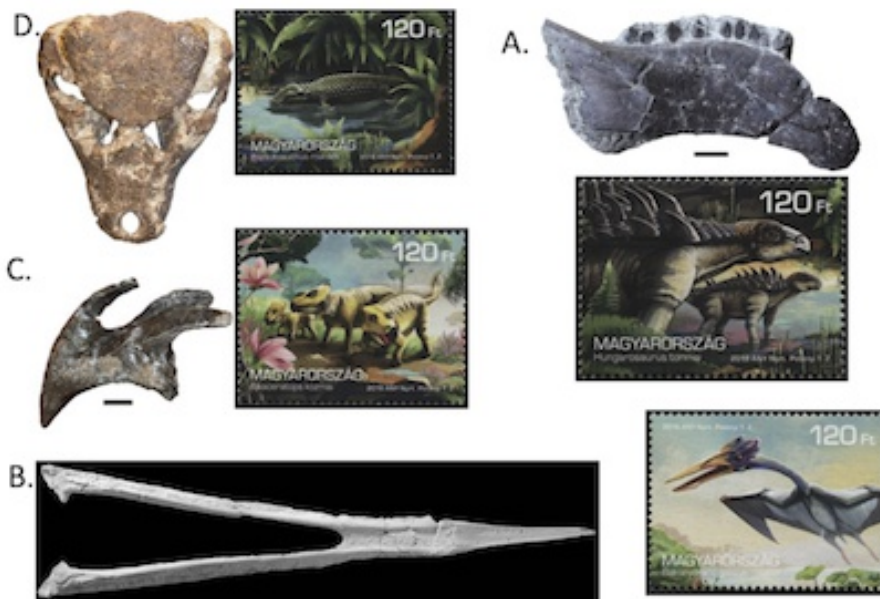


Figure 5: Images of fossil material from the Bakony Site with corresponding stamp. A. *Iharkutosuchus makadiei* skull (picture courtesy of <http://magyardinoszauros.hu/en/>), B. *Ajkaceratops kosmai* upper jaw with distinct beak-like shape. C. Lower jaw of *Bakonydraco galaczi*. D. Lower jaw of *Hungarosaurus tormai*. Fossil pictures B, C, and D are from Wikipedia.org, while the single stamp images are courtesy of Michael Kogan's <http://www.paleophilatelie.eu/index.html>.

to the bone structure in modern birds. The species was also named in honor of Géza Fodor, an operator of the Bakony Bauxite Mining Company. *Pneumatoraptor* is known from a few pieces of the shoulder girdle and limbs. The limb proportions suggest that *Pneumatoraptor* was about the size of a modern turkey. The reconstruction on the stamp shows *Pneumatoraptor* with feathers due to the similarity of *Pneumatoraptor* with other theropod dinosaurs that do have direct evidence of feathers (dromaeosaurids and troodontids).

*Bakonydraco galaczi* is not actually a dinosaur, but instead a

pterosaur. Pterosaurs were flying reptiles related to the dinosaurs. Dinosaurs, pterosaurs and crocodiles belong to a larger group of diapsid reptiles called the Archosaurs. *Bakonydraco* translates to the dragon of the Bakony Mountains. The species is also named after Paleontologist András Galács. This species was a common element of the fauna with many fossils of the vertebrae, jaws and limbs described from at least 57 individuals! The jaws of this animal were toothless and beak-like in shape.

*Hungarosaurus tormai* is the most well preserved dinosaur in the Bakony collections – with one individual having much of the skull, portions of the vertebrae, ribs, shoulder, right manus (paw), pelvis and over 100 osteoderms (bony plates embedded in the skin of the animal) preserved. *Hungarosaurus tormai*'s name honors the country of Hungary and András Tourma. Tourma was one of the people who discovered the Iharkút site in the Bakony Mountains where most of these fossils come from.

*Hungarosaurus* is an ankylosaurid dinosaur – squat herbivorous quadrupeds with extensively armored skin. The reconstructions suggest that this animal was 4 to 4.5 meters (13-15 ft) long!

*Iharkutosuchus makadiei* is another animal from the Iharkút site, but like *Bakonydraco* is not a dinosaur. Instead *Iharkutosuchus makadiei* is a crocodyliform – a group of archosaurs that include the modern crocodiles. *Iharkutosuchus* has been described from one complete skull and a variety of partial skull fragments and teeth. The teeth are unusual in that unlike most reptiles, *Iharkutosuchus* had different types of teeth in its jaws (heterodonty) – a more mammal-like characteristic. *Iharkutosuchus makadiei* is named for the Iharkút locality and for biologist László Makádi.

The last prehistoric animal in the set is *Pannoniasaurus inexpectatus*, a most unusual reptile. The animal's name is derived from the ancient Roman province of Pannonia which includes the Transdanubian portion of Hungary and -saurus (lizard). The *inexpectatus* portion of the species name is derived from the Latin for unexpected. *Pannoniasaurus* is a mosasaur – mosasaurs were diapsid reptiles

that are most closely related to squamates like lizards and snakes. All other fossil occurrences of Mosasaurs are in marine deposits – where these reptiles were top predators adapted for an aquatic lifestyle. *Pannoniasaurus inexpectatus* is an unusual mosasaur in that it is found in riverine deposits instead, suggesting unexpectedly that these were freshwater mosasaurs! A variety of fossil material from multiple individuals have been found including vertebrae, portions of the skull, pelvis and shoulder. Reconstructions suggest that this was a medium-sized Mosasaur approximately 6 meters (20 ft) in length.

For the interested reader, here is a brief list of resources that may be of interest:

**Magyar Post Materials for the 2018 and 2020 issues:**

<https://www.posta.hu/stamps/stamps/new-stamps/the-world-of-the-bakony-dinosaurs>

<https://www.posta.hu/stamps/stamps/new-stamps/the-wonderful-world-of-the-bakony-dinosaur-site-II>

**The Bakony Geopark**

<http://www.geopark.hu/en/home/bakony-balaton-geopark/geological-heritage>

**Hungarian and Eastern European Paleontology and Geology**

<http://magyardinoszaurusz.hu/en/>

Kercsmár, Z. (ed.), 2015, Surface geology of Hungary – Explanatory notes to the Geological Map of Hungary (1:500,000), Geological and Geophysical Institute of Hungary.

Weishampel, D.B. and Jianu, C.-M. 2011, Transylvanian Dinosaurs, The John Hopkins University Press, 301 p

A brief biographical sketch of the Baron Nopsca: <https://www.smithsonianmag.com/history/history-forgot-rogue-aristocrat-discovered-dinosaurs-died-penniless-180959504/>

The Bernissart Coal Mine Iguanodons of Belgium <https://artsandculture.google.com/exhibit/the-bernissart-iguanodons-royal-belgian-institute-of-natural-sciences/fQJiRgnsYJgwIA?hl=en>

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